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A NEW SPECIES OF MONITOR (PLATYNOTA: REPTILIA) FROM NORTHERN AUSTRALIA AND A NOTE ON THE STATUS OF *VARANUS ACANTHURUS INSULANICUS* MERTENS

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ABSTRACT

A new species of *Varanus* Merrem (Varanidae: Reptilia), *V. baritji* sp.nov., from the tropical north of the Northern Territory is described. It most closely resembles *V. acanthurus* Boulenger but colour and pattern easily distinguish the species. Recently collected specimens of *V. acanthurus insulanicus* Mertens from the Wessel island chain confirm the status of this subspecies

KEYWORDS: taxonomy, Reptilia, Varanidae, *Varanus*, new species, subspecies, northern Australia.

INTRODUCTION

The monitors or goannas of the genus *Varanus* Merrem, 1820 remain as one of the most interesting reptilian taxa. There are only thirty five described species (see Cogger 1986; Storr *et al.* 1983) yet these animals display considerable variation in their size and form. The varanids can range in size from the Komodo dragon *V. komodoensis* (Ouwens, 1912) which weighs up to 50 kg and may be 3 metres long (Auffenberg 1980), to animals as small as *V. brevicauda* Boulenger, 1898, which reach a maximum of 10 gm. and 23 cm long. Despite this range in size and the particular specializations in morphology exhibited by some species, these animals are always unmistakedly varanid in their form.

The monitors have an enormous distribution encompassing Africa, the Middle East, the U.S.S.R., south east Asia and Australia. Nevertheless, it is in Australia where the greatest diversity exist, and over 25 of the varanids are found in this continent. Indeed, three major radiations have been established, each of which has led to the formation of numerous species complexes (King and King 1975).

Perhaps the most successful of the Australian radiations is seen in the subgenus *Odatria* Gray, 1838. These generally small varanids include *V. acanthurus* Boulenger, 1885, *V. brevicauda* Boulenger, 1898, *V. caudolineatus* Boulenger, 1885, *V. eremius* Lucas and Frost, 1895, *V. gilleni* Lucas and Frost, 1895, *V. glauerti* Mertens, 1957, *V. glebopalma* Mitchell, 1955, *V. kingorum* Storr, 1980, *V. mitchelli* Mertens, 1958, *V. prasinus* (Schlegel, 1839), *V. primordius* Mertens, 1942, *V. pilbarensis* Storr, 1980, *V. scalaris* Mertens, 1941, *V. semiremex* Peters, 1869, *V. storri* Mertens, 1966 and *V. tristis* (Schlegel, 1839). Several of these species exhibit clinal variations in their morphology and some have been subdivided into subspecies.

The spiny tailed monitors *V. acanthurus*, *V. primordius*, *V. storri* and *V. storri ocreatus* are one of the more morphologically confusing complexes within the *Odatria*. For example, *V. acanthurus* which is distributed across the northern half of Australia has at times included the subspecies *V. a. brachyurus* Sternfield, 1919, and *V. a. insulanicus* Mertens, 1958. These subspecies are recognised by Cogger (1986), whereas, Storr (1980) only recognizes *V. acanthurus*. On the other hand, *V. primordius* (which has also at one time been a subspecies of *V. acanthurus*) has a more restricted distribution, and is only found in the northern Northern Territory. Similarly, *V. storri* is found in north western Queensland and *V. storri ocreatus* occurs in the Kimberley and the north western Northern Territory.

This paper describes a new species of spiny tailed monitor from the *V. acanthurus* complex which is restricted in its distribution to the far north of the Northern Territory. The status of *V. acanthurus insulanicus* is also examined.

MATERIALS AND METHODS

A total of 12 specimens of an undescribed species of *Varanus* were compared to 54 adult specimens of *V. acanthurus* collected from twenty-seven localities throughout the Northern Territory. A series of 22 scale counts, colouration sites and measurements were taken, and where necessary micrometer adjusted calipers and a steel rule were used.

SYSTEMATICS

Varanus baritji sp. nov.
(Fig. 1)

Type material. HOLOTYPE - NTM R.13192, ♀, Mirrngadja, N.T., a rock outcrop on the Arafura Swamp, 12° 39′S 135° 12′E, 5 June 1985, coll. Dr N.G. White. This specimen laid three eggs in captivity. PARATYPES - NORTHERN TERRITORY: NTM R.13150, ♀, Donydji outstation, 12° 24′S 135°28′E, 28 August 1985, coll. Bambalmir, at a rock outcrop called Marrpinydjan; NTM R.13151, ♂, Donydji outstation, 12° 24′S 135° 28′E, 27 August 1985, coll. Warnamal, at a stony outcrop west of the outstation; NTM R.8346-8, ♀, ♀, ♂, 10km S. Adelaide River township, 13° 21′S 131° 09′E, 7 February 1980, coll. G. Husband, N. Oakes and M. Anthony, under flat rocks on soil; NTM R.8931, ♂, 20km S. Adelaide River township, 13° 27′S 131° 11′E, 10 August 1980, coll.G. Husband and G. Armstrong under rock on hillside; NTM R.3107, ♀, 8.0km N. Pine Creek, 13° 47′S 131° 47′E, 20 February 1977, coll. R. Wells, K. Martin and D. Metcalfe, beneath granite exfoliation on soil; NTM R.6531, ♀, Katherine, 14° 28′S 132° 16′E, December 1978, coll. I. McKinna; NTM R.8364, ♂, Daly River road, 13° 30′S 131° 03′E, 5 February 1980, coll. G. Husband, N. Oakes and M. Anthony in limestone outcrop; AM R.51912, ♂, Daly River road turn off, Stuart Highway, 13° 29′S 131° 11′E, 30 September 1975, coll. P. Rankin; AM R.88844, ♂, Jabiluka, 12° 34′S 132° 55′E, coll. R. Sadlier.

Diagnosis. A moderately sized member of the *V. acanthurus* species complex, *V. baritji* is distinguished from *V. primordius* by its larger size (95-110 mm SVL, compared to 121-252 mm SVL), greater number of midbody scales (60-66 compared to 80-112) and an ochre back colouration with black spotting compared to an olive brown back in *V. primordius*. *V. baritji* is distinguished from *V. storri* by its greater size (49-132 mm SVL) and greater number of midbody scales (70-94) although these characters overlap (Table 1). Further differences are seen between these species in colouration and back pattern with *V. baritji* having distinct lateral facial stripes not present in *V. storri* which has a relatively uniform sandy colouration. *V. baritji* is similar to *V. acanthurus* in general scalation, but is markedly different in colouration and pattern. *V. acanthurus* is characterized by a back pattern showing numerous ocelli i.e. black or dark brown spots surrounded by a white or light coloured ring further surrounded by a dark brown ring. These outer rings form a reticulate back pattern. These ocelli are characteristically absent in *V. baritji* although in some specimens the black spots on the uniform ochre back pattern aggregate to form a series of rings which may also form a reticulate pattern. An additional diagnostic characteristic is the presence of a series of longitudinally

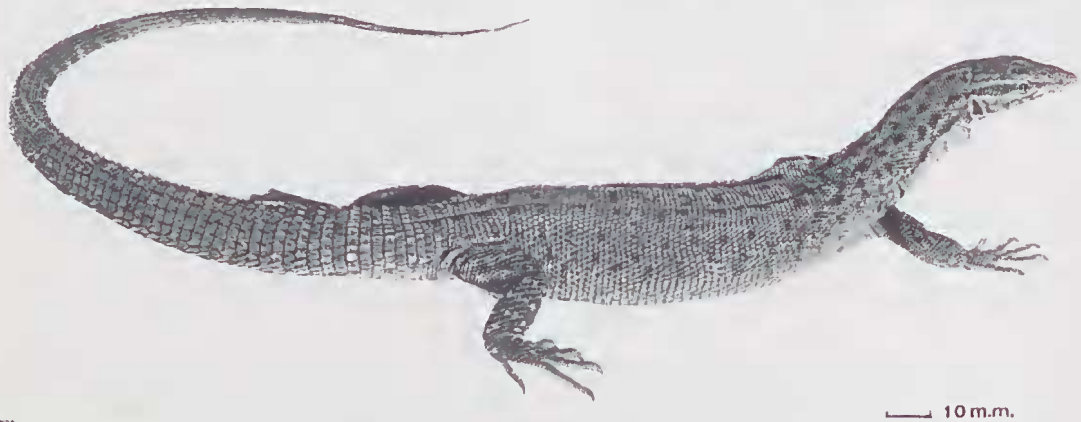

Fig. 1. The holotype of *Varanus baritji* in life. Note the distinctive patterning of this species, and compare to Fig. 2.

arrayed yellow (or off white) and black (or dark brown) dorsal neck stripes in *V. acanthurus*. These markings are either completely absent in *V. baritji*, where the dorsal surface of neck and head are mid brown, or in occasional specimens, black spots from the dorsal pattern extend on to the neck or head. *V. baritji* also has a distinct lemon yellow gular region.

Description. The holotype has the following combination of characteristics.

Head: Width 15.6 mm, depth 11.5 mm, 5.8 mm long from tip of rostral scale to anterior margin of nostril. 6.4 mm long from nostril to anterior margin of orbit; 21.9 mm long from anterior margin of ear to tip of rostral scale. 7 interorbital scales on dorsal surface of head on a line between orbits, not including supraorbitals, if these are included 23 interorbitals. Interorbitals much larger than supraorbitals. 26 supralabials (L and R). 5 rows of suborbital scales, (L and R). 5 loreal scales between nostril and eye (L and R). Head scales small and smooth, nostril dorsolateral. Ear opening oblique, partially covered by skinfold, 3 times long as wide.

Body: Elongate and slender body, oval in section with moderate dorso ventral compression. Neck long slender, anterior edge of ear to forelimb 38.3 mm. Snout-vent length 168 mm. Tail length 286 mm. Long tail round in section anteriorly, to triangular in section along midlength with dorsal apex. Dorsal and lateral caudal scales with strong spinose keel. Tail with two keeled crest. Dorsal body scales occur in bands. Scales oval shape with flat posterior-anterior aligned keel which is parallel sided and surrounded by small granules. Laterally, keel enlarges to dominate the scale. Ventrally, scales are larger, hexagonal and smooth, black spot on posterior angle. Midbody scale rows 80 (around abdomen in midline), ventral scale rows 57 from gular fold to opposite middle of hind leg. Cluster of 12 enlarged caudal spines (L and R) in rows on ventral surface, posteriorly adjacent to cloaca. Rows directed from lateral surface to midline.

Limbs: Pentadactylic with long pointed toes. Forelimb shorter (45.6 mm) than hindlimb (62.3 mm). Fourth toe very long with 21 scales (L and R) on under surface excluding claw.

Colouration (in life).

Head: Dorsal surface mottled mid brown with few black spots. Pronounced black eyestripe extends laterally from nostril through eye to above ear where it breaks up into black spots. Narrow white borders to eyestripe ventrally. Dark brown supralabials (Fig. 1). Ventral surface of head and chin, bone coloured. Gular region of throat lemon yellow.

Body: Dorsal surface red ochre with irregular black spots each 3-4 scales across. Black spots tend to form broken bars laterally. Ventral surface buff coloured with irregular dark brown single scales. Occasional bone coloured scales scattered in anterior lateral area emanating from whitish facial stripes. (Fig. 1).

Forelimbs: Midbrown with irregular bone and black spotting. Dorsal surface of feet dark brown, ventral surface bone coloured with dark brown calli.

Hindlimbs: Dark brown with bands and spots of off-white scales. Dorsal surface of

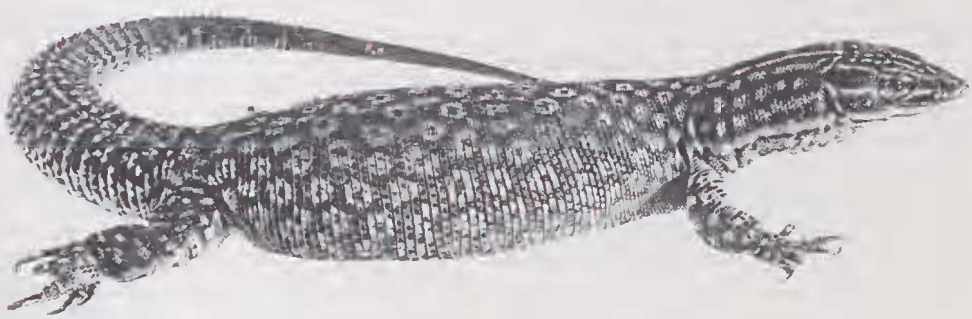

Fig. 2. A typical specimen of *Varanus acanthurus acanthurus*. Note the clearly defined ocelli in the back pattern and the contrasting black and yellow striping of the neck and head.

feet dark brown, ventral surface bone coloured with dark brown calli.

Tail: Anterior dorsal surface has alternate bands of black and light brown scales gradually becoming mid brown posteriorly. Bone to light brown on ventral surface.

Distribution. The known distribution of *V. baritji* is the "Top End" of the Northern Territory, north of 15° South (Fig. 3). Specimens from the western sector of the distribution are sympatric with *V. primordius*. Populations of *V. acanthurus* occur to the south and west of the *V. baritji* distribution and contact it at both Adelaide River and Katherine.

Etymology. The species name *V. baritji* is derived from the word "Baritj". "Baritj" is a word from the Ritharrju-Wagilak language group used by the aboriginal people from the Donydji area of northern Arnhemland. "Baritj" means white, and the species *V. baritji* is named after Dr Neville White who has worked extensively with the people from this region and who brought the holotype to Darwin for our examination.

Variation and Comparison to *V. acanthurus*. The most significant difference between these morphologically similar species is the distinctive colouration and patterning. In his description of the "eyed *Odatria*" Gray (1845) defined the species from N.W. Australia as being "Black, with rather large yellow rings". Although this nomenclature is invalid and Boulenger's (1885) name of *Varanus acanthurus* applies, this outstanding characteristic remains. *V. acanthurus* has a very dark background colouration which forms a reticulate pattern around a series of yellow to off white ocelli which include a black spot in their centre. In addition, *V. acanthurus* has a dark brown to black head and neck with a series of yellow to off white longitudinal stripes extending from the shoulder, up the dorsal and lateral surfaces of the neck, then on to the head (Fig. 2). In some specimens the dorsal surface of the head is immaculate. These stripes were always encountered and appear to be a more reliable character than the ocelli, which are absent in certain Western Australian specimens (see also Storr, 1980). Both presence of ocelli and neck stripes should be used as a corroborative characteristic which diagnosing *V. acanthurus*.

In contrast, specimens of *V. baritji* have an immaculate brown head or on occasions with several black spots (Fig. 1). Black spots are also present on the neck in some specimens, but this area is generally unmarked. Yellow and black stripes were not observed on the neck. A distinctive black facial mask bordered in white is present on all specimens and contrasts with the brown face (Fig. 1).

The back pattern of *V. baritji* is most distinctive. A series of irregular black spots are scattered across a red ochre background. In some individuals the black spots intermesh to produce occasional black rings. In other specimens the complete dorsal surface is covered by a reticulate pattern of black rings. These differ from the ocelli seen in *V. acanthurus* in that the rings do not include a white or yellow area with a black spot in the middle. In some individuals of *V. baritji* off white flecking occurs on the back and sides of the thoracic region and generally extends from

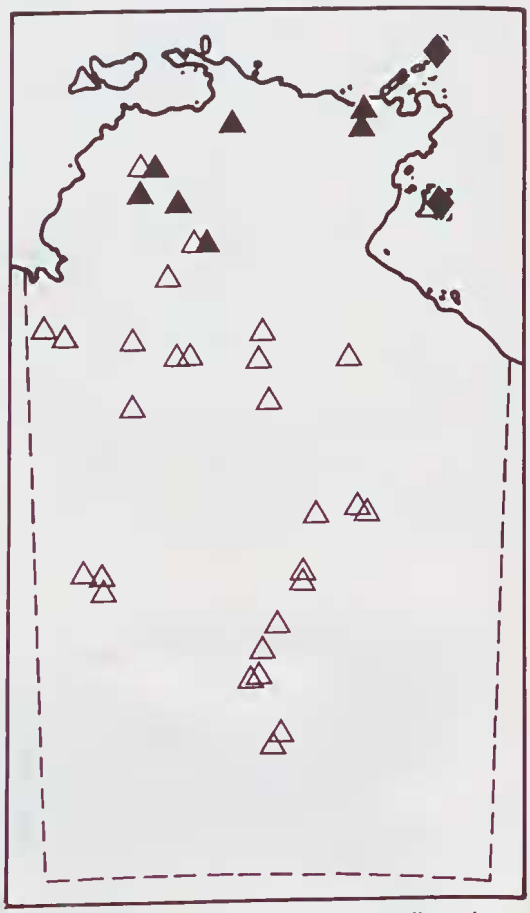

Fig. 3. The distribution of *Varanus baritji* specimens (solid triangles), compared to that of the specimens of *V. ananthurus acanthurus* (hollow triangles), and *V. acanthurus insulanicus* (solid diamonds) in the Northern Territory.

Table 1. Comparison of some morphometric and meristic characteristics which are diagnostic for members of the *Varanus acanthurus* species complex.

Character	*V. storri*	*V. primordius*	*V. a.acanthurus*	*V. a.insulanicus*	*V. baritji*
Snout-Vent length in mm.	49-132	95-110	65-240	226-250	121-252
Number of midbody scales	70-94	60-66	88-112	91-98	80-112
Ocelli in back pattern	-	-	+	+	-
Striping on neck	-	-	+	+	-

the white stripes in the facial mask. These are individually pigmented scales and they sometimes appear as rows giving the impression of being lateral stripes.

A summary of measurable and meristic characteristics for *V. baritji, V. acanthurus acanthurus* and *V. acanthurus insulanicus* are shown in (Table 2).

Comparative *Varanus acanthurus acanthurus* material. NORTHERN TERRITORY: NTM R.9850, 20km S. Adelaide River, 13° 25′S 131° 09′E, 10 August 1980, coll. G. Husband and G. Armstrong; NTM R.0895, R.3827, Manbulloo, 14° 31′S 132° 12′E, 4 June 1974, coll. N. Boyd; NTM R.6888-9, 112km W. Katherine, 15° 14′S 131° 36′E, 17 April 1979, coll. P. Horner, B. Miller, D. and G. Armstrong; NTM R.7082, Victoria Highway, 16° 03′S 129° 16′E, coll. G. Gow and P. Horner; NTM R.5679, Keep River National Park, 16° 08′S 129° 39′E, 1 November 1981, coll. R. Pengilley; NTM R.2125-6, R.2147-8, 2ml. W. Victoria River Downs, 16° 22′S 130° 59′E, 22-24 April 1976, coll. G. Gow and N. Boyd; NTM R.3606, 1.2km S. Dunmarra, 16° 22′S 133° 25′E, 18 May 1977, coll. G. Gow and P. Horner; NTM R.3379-80, 17km E. Top Springs, 16° 37′S 131° 56′E, 10 April 1977, coll. R. Wells and P. Horner; NTM R.6604-5, 11.2km S. Top Springs, 16° 39′S 131° 46′E, 10 April 1979, coll. P. Horner, B. Miller, D. and G. Armstrong; NTM R.2591-2, 4.5km S. Dunmarra, 16°44′S 133° 24′E, 3 December 1976, coll. R. Wells and D. Metcalfe; NTM R.3337-8, 4.5km S. Dunmarra, 16° 44′S 133° 24′E, 10 April 1977, coll. R. Wells and P. Horner; NTM R.3336, 215km W. Borroloola, 16° 45′S 135° 03′E, 10 April 1977, coll. R. Wells and P. Horner; NTM R.6698-701, Wave Hill Station, 17°29′S 130° 57′E, 12 April 1979, coll. P. Horner, B. Miller, D. and G. Armstrong; NTM R.12795-6, Wave Hill Station, 17° 29′S 130° 57′E, 14 November 1984, coll. P. Horner; NTM R.5312-3, Elliot, 17° 33′S 133° 32′E, 25 May 1978, coll. G. Gow and P. Horner; NTM R.9318, Barkly Highway, 19° 23′S 135° 17′E, 27 September 1976, coll. R. Pengilley and S. Raskin; NTM R.2580-2, 32km E. Three Ways, 19° 24′S 134° 30′E, 3 December 1076, coll. R. Wells and D. Metcalfe; NTM R.5768, Frewena, 19° 25′S 135° 24′E, 1 January 1978, coll. G. Gow, P. Horner and K. Roth; NTM R.6440, Frewena, 19° 25′S 135° 24′E, 18 March 1979, coll. P. Horner, J. Griffiths and K. O'Brian; NTM R.8511, Frewena, 19° 25′S 135° 24′E, 2 March 1980, coll. G. Gow, P. Horner and K. Roth; NTM R.9771, Frewena, 19° 25′S 135° 24′E, 10 February 1981, coll. G. Gow and P. Horner; NTM R.1525-6, Rabbit Flat, 20° 34′S 130° 16′E, 13 October 1975, coll. G. Gow; NTM R.0894, Devils Marbles, 20° 34′S 134° 16′E, 6 September 1974, coll. G. Gow; NTM R.9277, Devils Marbles, 20° 34′S 134° 16′E, 28 March 1979, coll. B. Miller; NTM R.1486, The Granites, 20° 35′S 130° 21′E, 11 October 1975, coll. P. Rankin; NTM R.1547-8, Horden Hill, 20° 39′S 130° 19′E, 14 October 1975, coll. P. Rankin and P. Horner; NTM R.1295, Wauchope, 20° 39′S 134° 13′E, 4 October 1975, coll. G. Gow; NTM R.5748, Wauchope, 20° 39′S 134° 13′E, 31 May 1978, coll. G. Gow, P. Horner and K. Roth; NTM R.1324, Barrow Creek, 21° 31′S 133° 53′E, 5 October 1975, coll. P. Horner; NTM R.1777, Barrow Creek, 21° 31′S 133° 53′E, 28 October 1975, coll. G. Gow; NTM R.5366, Barrow Creek, 21° 31′S 133° 53′E, 28 May 1978, coll. G. Gow and P. Horner; NTM R.12706, Hanson River, 22° 00′S 133° 24′E, 10 September 1984, coll. P. Horner and H. Larson; NTM R.1340, 27km S. Ti-Tree, 22° 26′S 133° 24′E, 5 October 1975, coll. G. Gow; NTM R.0415, Prowse Gap, 22° 34′S 133° 20′E, 13 September 1974, coll. K. Roth; NTM R.0768, 11ml N. Alice Springs, 23° 33′S 133° 51′E, 14 February 1975, coll. K. Roth; NTM R.5418, Mt. Gillen, 23° 43′S 133° 48′E, 10 August 1976, coll. K. Roth.

The status of *Varanus acanthurus insulanicus*. Mertens (1958) described the subspecies *Varanus acanthurus insulanicus* from two specimens collected on Groote Eylandt, N.T. These animals were distinguished from *V. a. acanthurus* by their large size and melanistic colouration (S.V.L. 226mm (our measurements) and 230mm).

We have examined two additional specimens of *V. a. insulanicus* from Marchinbar Island in the Wessel Island chain. These are NTM R. 8937 from Two Island bay and NTM R. 8939 from Red Point. These specimens are also very large in comparison to *V. a. acanthurus* being 235mm S.V.L. and 250mm S.V.L. respectively. It should be noted that the largest specimen of a series of 54 *V. a. acanthurus* from the Northern Territory was 240mm S.V.L., whereas. the largest of a series of 111 measured by Storr (1980) from Western Australia was 237mm S.V.L.

Mertens (1958) describes *V. a. insulanicus* as being melanistic and examination of the holotype indicates that this is so. The specimens from Marchinbar island are also very melanistic and are similar in most respects to the holotype. All of these specimens have retained the black and yellow longitudinal neck stripes and head patterning found in *V. a. acanthurus*. The back pattern consists of black centred off white to yellow ocelli surrounded by an irregular black matrix. Many of the ocelli have broken down with the white areas interconnecting and amplifying to produce a roughly black and white banded effect. Clearly, the variation in size and colouration exhibited by these island specimens could be a reflection of their isolation and local adaptation. It should be noted that Storr (1980) documented significant differences in back pattern and colouration in *V. a. acanthurus* from different regions of Western Australia and also found that the northern specimens were distinctly melanistic.

The island distribution of *V. a. insulanicus* is bisected by an eastern extension of Arnhem Land incorporating the Gove Peninsula. It seems reasonable to expect that *V. a. insulanicus* might be found in this region. It is also worth noting that the known populations of *V. a. insulanicus* are separated from the mainland population of *V. a. acanthurus* by the intervening range of *V. baritji* in the northern part of its distribution

Table 2. Morphometric and meristic characteristics of *Varanus baritj, V. acanthurus acanthurus* and *V. a. insulanicus*

	V. baritji N=12		*V. a acanthurus* N=16		*V. a insulanicus* N=3	
	$\bar{X}$	R	$\bar{X}$	R	$\bar{X}$	R
Snout-Vent length in mm	171.50	(121-252)	179.69	(120-240)	237.00	(226-250)
Tail length in mm	296.90	(206-472)	280.29	(182-366)	422.00	(-422)
Forelimb length in mm	47.88	(33.4-70.8)	46.79	(31.4-67.3)	66.87	(62-69.5)
Hindlimb length in mm	63.26	(45.3-95.2)	64.90	(43.6-87.3)	93.07	(82.8-99.2)
Head width in mm	16.15	(10.8-23.8)	18.13	(12.4-26.1)	23.07	(22.7-23.5)
Head depth in mm	12.17	(7.5-18.2)	13.86	(8.8-20.2)	18.72	(18.3-19.2)
Nostril-snout length in mm	5.58	(4.3-8.1)	5.45	(4.1-7.9)	7.63	(7.3-8.3)
Nostril-orbit length in mm	6.38	(4.7-9.3)	6.57	(4.8-8.9)	9.37	(9.0-9.7)
Ear-snout length in mm	27.07	(21.4-39.5)	29.14	(21.9-39.6)	33.67	(28.3-37.5)
Forelimb-ear length in mm	38.81	(29.3-59.7)	38.53	(24.3-54.0)	54.30	(51.5-59.6)
Number of enlarged interorbitals	6.83	(6-8)	6.19	(5-8)	6.33	(6.0-7.0)
Number of scales between eyes	25.67	(21-29)	25.13	(22-30)	24.33	(23-26)
Number of supralabials	27.67	(26-31)	27.31	(24-31)	27.17	(26-29)
Number of scales below orbit	5.04	(4-6)	4.66	(4-6)	5.50	(5-7)
Number of scales between nostril-eye	5.36	(4-7)	5.47	(4-7)	5.33	(4-7)
Number of mid body scale rows	96.42	(80-112)	98.94	(91-108)	94.33	(91-98)
Number of ventral scale rows	60.92	(56-67)	64.38	(58-71)	59.33	(58-60)
Number of subdigital lamellae	21.25	(18-23)	20.81	(19-24)	21.66	(20-24)
Number of caudal scale rows	30.42	(28-34)	31.50	(28-35)	29.67	(29-30)
Snout-vent length to tail length ratio	0.58	(0.53-0.64)	0.62	(0.58-0.66)	-	(-0.54)
Head width to head depth ratios	1.34	(1.18-1.44)	1.32	(1.17-1.51)	1.23	(1.18-1.26)
Head depth to head length ratios	2.27	(1.85-2.85)	2.14	(1.74-2.49)	1.80	(1.52-1.95)

(Fig. 2) although the situation in the south western sector of the Gulf of Carpentaria is unknown.

In summary, we feel that *V. a. insulanicus* is an isolated island form of *V. a. acanthurus* which has differentiated from the norm in both size, and to a degree, in back pattern. However, both of these characteristics intergrade to some extent in the two subspecies. We therefore recognize this as a valid subspecies, but are reluctant to elevate it to the species level at this stage.

Comparative *Varanus acanthurus insulanicus* Type material. HOLOTYPE - AM R.11037, Groote Eylandt, 13° 49′S 136° 38′E, 1934, Northern Territory, coll. H. Perryman.

Comparative *Varanus acanthurus insulanicus* Additional material. NORTHERN TERRITORY: NTM R.8937, Two Island Bay, Marchinbar Island, 11° 05′S 136° 43′E, 8 October 1972, coll. D. Lindner; NTM R.8939, Red Point, Marchinbar Island, 11°17′S 136° 35′E, 18 October 1972, coll. D. Lindner.

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